SURFACE MOUNT OPTOELECTRONIC COMPONENT

FIELD OF INVENTION

The invention relates to a surface mount optoelectronic component. The component is designed to be able to serve multiple modes of illumination; top, side and bottom depending on the method of mounting. The mounting connections are provided by the inherent electrically conductive base material. No mechanical forming process is required to produce the desired mounting connection. The invention is also capable of higher heat dissipation due to the thicker base material used and the heat sink incorporated into the design.

BACKGROUND OF THE INVENTION

In order to fulfill the different customers' requirements, different component configurations are available in the market today. Two key physical variations normally discussed for optoelectronic components are illumination direction and lead bending.

For illumination direction, customers may opt for either the top or side illumination version. As the name implies, top illuminators have an illumination source on the top of the component surface while side illuminators have a source on the side of the component. The choice depends very much on the application itself. However, each of these configurations is unique in terms of physical dimension and is not interchangeable. Customers are expected to order the specific type for their needs.

As for lead bending, common versions available in the market include the J-bend, gull-wing, reverse gull-wing and etc. These are the configurations for the mounting connections onto sub-systems such as PCBs. Based on current market information; there are still no surface mount optoelectronic packages that do not require mechanical forming to create the desired mounting connections.

BRIEF DESCRIPTION OF DRAWINGS

The drawings enclosed are as follows:

Figure 1A is a three-dimensional top view of the invention.

Figure 1B is a three-dimensional bottom view of the invention.

Figure 2 is a cross sectional view of the invention depicting the assembly consisting of base material, plastic housing, optoelectronic chip and cavity within the plastic housing which is filled by a transparent or translucent resin material.

Figure 3 shows the invention being mounted onto a PCB using the side protrusions as a means for electrical connection.

Figure 4 shows the invention being mounted onto a PCB, similar to Figure C but on a reverse orientation so as to provide bottom illumination.

DETAIL DESCRIPTION OF THE INVENTION

The invention relates to a surface mount optoelectronic component.

With reference to the invention, the optoelectronic component is based on the surface mount technology. A thick electrically conductive material (1) is used to serve as the base for the assembly. An opaque plastic material (2) is used to provide the housing for the whole component. A cavity (5) is designed within the plastic material. An optoelectronic chip (3) is mounted within this cavity. This cavity is filled with a hard transparent or translucent resin material so that optical radiation may be transmitted or received via this window. Electrical connection(s) between the chip and the base material is provided by a metallic wire (4).

Subsequent connections to the external sub-systems such as PCBs are provided by the base material itself; typically by soldering. No extra mechanical forming processes are necessary to create the external connections. The base material extends all the way from the middle to the bottom (8) and to one of the side walls (7); until the extend of protruding outside the plastic package. The bottom surface (8) will be used for connection when a top illuminator is required. Alternatively, the side surface (7) could be used for connection if the component is used as a side illuminator. This feature ultimately yields a universal package design for optoelectronic components where both top and side illumination capabilities are combined into one single package. The base material also protrudes to the other sides of the package (6). These protrusions act as heat sinks to improve heat dissipation from the component.

In another mounting configuration, these side protrusions (6) can also be used as a means of connection to external surfaces such as PCBs as illustrated in Figure C and D. In this case, the component will sit into the sub-system i.e. PCB and can be used for top and also bottom illumination. This mounting configuration will reduce the height profile of the component above the sub-system since a portion of the component is below the sub-system's surface. The other two exposed surfaces (7) and (8) will then act as heat sinks instead when used in such manner.

Inherent in the design, no lead forming is required since the external connections are provided by the base material. This feature eliminates mechanical stresses that are typically subjected to package during conventional forming processes. Consequently, the package robustness and reliability is greatly enhanced.

Another inherent feature of this invention is its relatively thicker base material compared to other corresponding products in the market. This coupled with the 'heat sinks' greatly improves the package's ability to dissipate heat. Higher current or power could be applied to the devices to yield better performance.